Claims

[c1] 1.A process for producing phosgene, comprising:
introducing a carbon monoxide stream to a metal oxide impregnated activated carbon;
reducing a hydrogen sulfide concentration in the carbon monoxide stream to produce a cleaned stream, wherein a cleaned stream hydrogen sulfide concentration is less than or equal to about 20 ppm; and
reacting carbon monoxide in the cleaned stream with chlorine to produce phosgene.

[c2] 2.The process of Claim 1, further comprising:
introducing the carbon monoxide stream to activated carbon that has not been impregnated with a metal oxide prior to introducing the carbon monoxide stream to the metal oxide impregnated activated carbon; and
reducing a concentration of at least one of carbonyl sulfide and carbon disulfide in the carbon monoxide stream.

[c3] 3.The process of Claim 2, further comprising:
regenerating the metal oxide impregnated activated carbon by:
ceasing the introduction of the carbon monoxide stream to the metal oxide impregnated activated carbon;
introducing an inert gas stream comprising oxygen to the metal oxide impregnated activated carbon, wherein at least one of the metal oxide impregnated activated carbon is heated to a temperature of greater than or equal to about 350°C or the inert gas stream is at a temperature of greater than or equal to about 350°C; and
removing sulfur dioxide from the metal oxide impregnated activated carbon.

[c4] 4.The process of Claim 3, wherein the oxygen is present in the inert gas stream in an amount of about 0.2 vol% to about 2 vol%, based upon a total volume of the inert gas stream.

[c5] 5.The process of Claim 1, wherein the metal oxide is selected from the group consisting of copper oxide, lanthanum oxide, zinc titanate, iron oxides, calcium oxide, silica, aluminum oxide, and combinations comprising at least one of the foregoing metal oxides.

[c6] 6.The process of Claim 5, wherein the metal oxide comprises copper oxide.

[c7] 7.The process of Claim 1, wherein the hydrogen sulfide concentration is less than or equal to about 10 ppm.

[c8] 8.The process of Claim 7, wherein the hydrogen sulfide concentration is less than or equal to about 2 ppm.

[c9] 9.The process of Claim 8, wherein the carbon monoxide stream introduced to the metal oxide impregnated activated carbon has a hydrogen sulfide concentration of greater than or equal to about 100 ppm.

[c10] 10.The process of Claim 1, further comprising removing water from the cleaned stream to form a dried stream, prior to reacting the carbon monoxide with the chlorine.

[c11] 11.The process of Claim 10, further comprising mixing the dried stream with the chlorine prior to introducing the dried stream to a reactor.

[c12] 12.The process of Claim 1, further comprising introducing the cleaned stream to an activated carbon that has not been impregnated with a metal oxide, prior to reacting the carbon monoxide with the chlorine.

[c13] 13.The process of Claim 1, further comprising adjusting a moisture content of the carbon monoxide stream prior to introducing it to the metal oxide impregnated activated carbon.

[c14] 14.A system for producing phosgene, comprising:
a carbon monoxide supply;
a metal oxide impregnated activated carbon; and
a reactor disposed downstream of and in fluid communication with the metal oxide impregnated activated carbon and with a chlorine supply.

[c15] 15.The system of Claim 14, further comprising an initial activated carbon that has not been impregnated with a metal oxide disposed upstream and in fluid communication with the metal oxide impregnated activated carbon.

[c16] 16.The system of Claim 15, further comprising a moisture removal unit disposed downstream of the metal oxide impregnated activated carbon and upstream of the reactor.

[c17] 17.The system of Claim 16, further comprising a mixer disposed downstream of the

moisture removal unit and upstream of the reactor.

[c18] 18.A system for producing phosgene, comprising:

a carbon monoxide supply;

a first sulfur removal unit comprising an initial activated carbon that has not been impregnated with a metal oxide;

a second sulfur removal unit comprising a metal oxide impregnated activated carbon downstream and in fluid communication with the first sulfur removal unit;

a moisture removal unit disposed downstream of and in fluid communication with the second sulfur removal unit; and

a reactor disposed downstream of and in fluid communication with a chlorine supply unit and the moisture removal unit.